

FEEDBACK AMPLIFIER WITH CLOSED LOOP

AIM:

Design a Feedback Amplifier with close loop using Op Amp of Output Resistance $1\text{K}\Omega$.

Given:

$$A = 200 \text{ V/V}, R_{in} = \infty, R_{out} = 10\text{K}\Omega$$

- 1) Without Feedback Loading
- 2) With Feedback Loading

APPARATUS REQUIRED:

LTSpice Software.

THEORY:

$$R_{out}' = R_{out} / (1 + AK)$$

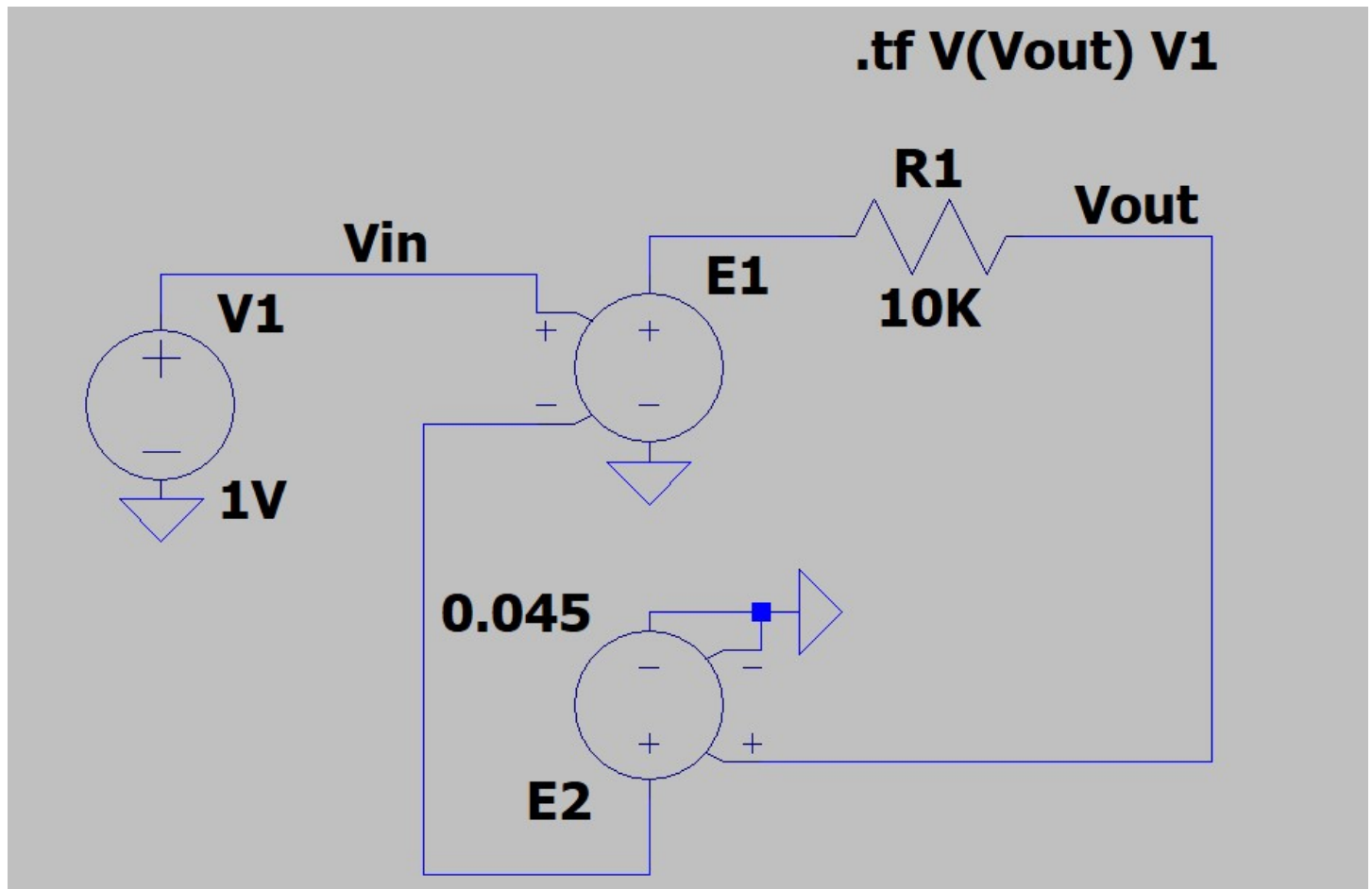
$$1\text{K} = 10\text{K} / (1 + 200 * K)$$

$$1 + 200 * K = 10$$

$$K = 9/200 = 0.045$$

Without feedback loading

Circuit:



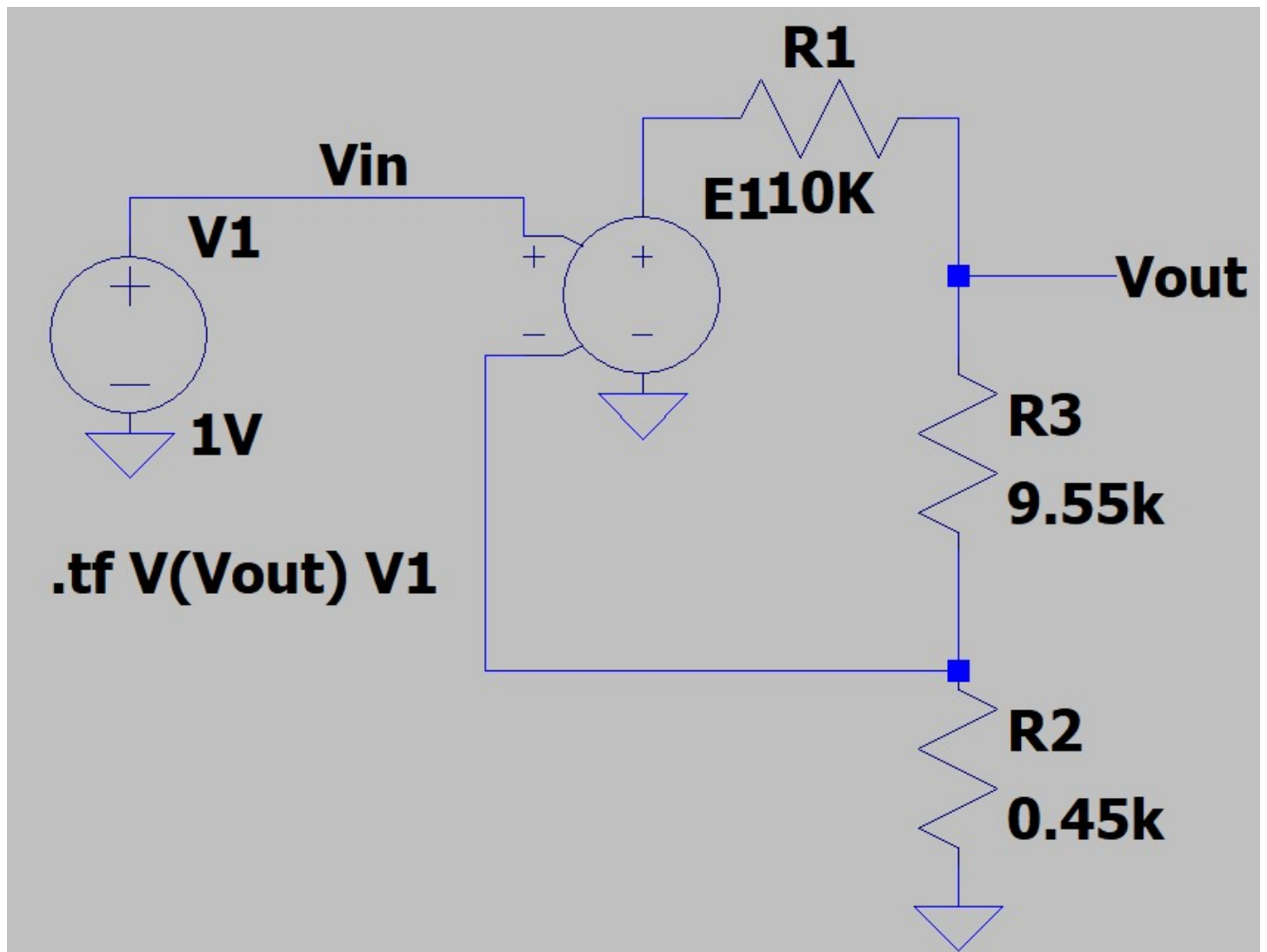
Output:

```
--- Transfer Function ---  
Transfer_function:      20      transfer  
v1#Input_impedance:    1e+020   impedance  
output_impedance_at_V(vout): 1000 impedance
```

With feedback loading

Considering R_{in} as infinity

Circuit:

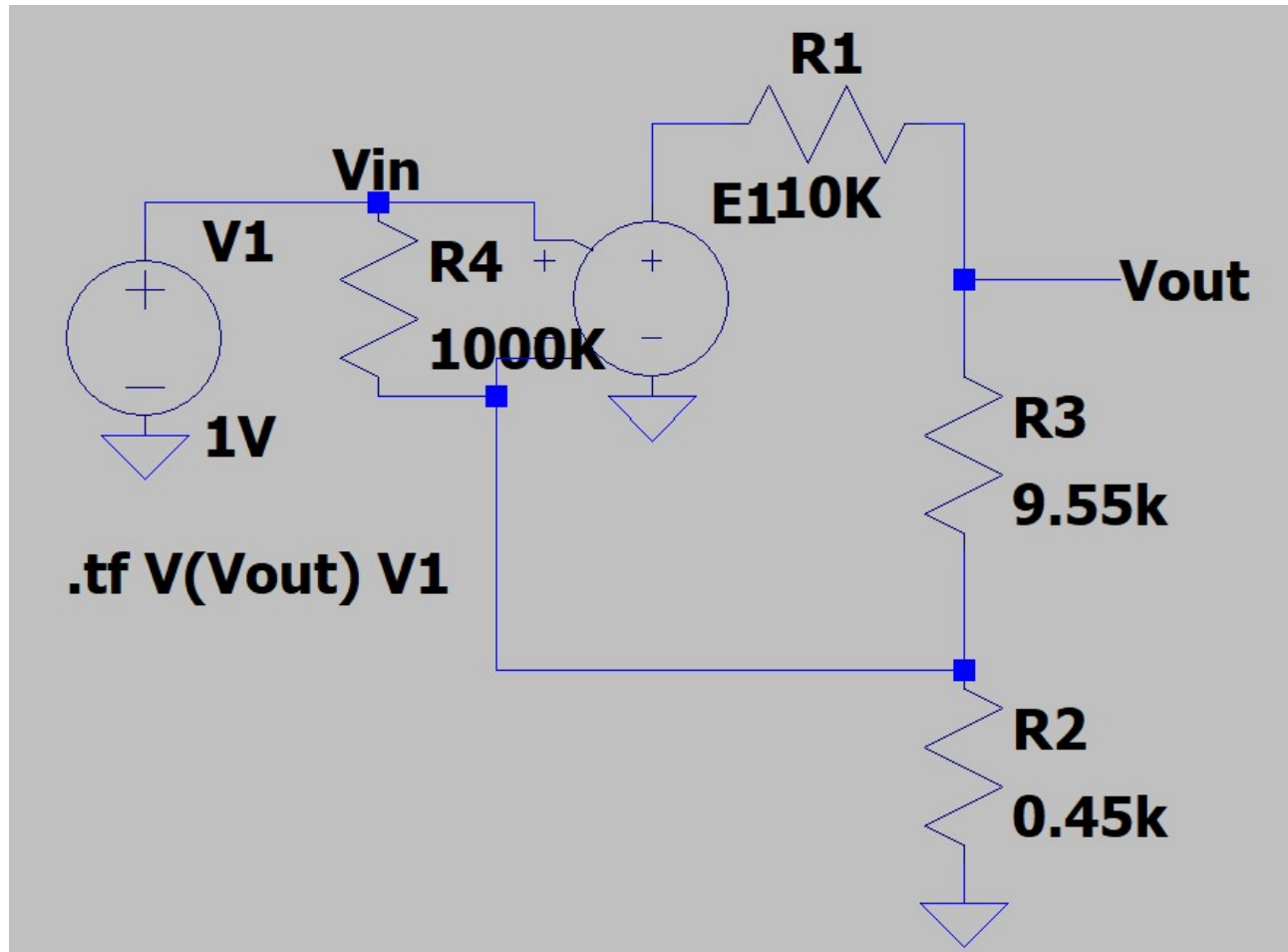


Output:

```
--- Transfer Function ---
Transfer_function:      18.1818      transfer
v1#Input_impedance:    1e+020      impedance
output_impedance_at_V(vout): 909.091  impedance
```

Considering R_{in} as $1M\Omega$

Circuit:



Output:

```
--- Transfer Function ---
Transfer_function:      18.1804      transfer
v1#Input_impedance:    5.50044e+006  impedance
output_impedance_at_V(vout): 909.409  impedance
```

RESULT:

The transfer function decreases when feedback loop is considered non ideal , and also when input impedance is decreased.